Valorisation of atypical land in cattle production systems in search of self-sufficiency

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1) SourceN Project

Context:

Intensification of agricultural practices at the expense of biodiversity (Dìaz and Malhi, 2022 ; Rigal et al., 2023)
Finding new ways to produce high-quality food considering the challenges of climate change (Wezel et al., 2009), and in order to implement farms self-sufficiency

Atypical resources as an opportunity to meet these challenges in European livestock systems

What is an atypical resource?

- Comes from the Natural Capital of farms/ Spontaneously present on farms
- Perceived as non-productive or counterproductive. Lack of data on their nutritional and feeding values.

=> *Atypical and alternative resources that are not currently valued*

Atypical resources in the French « Grand Ouest » region

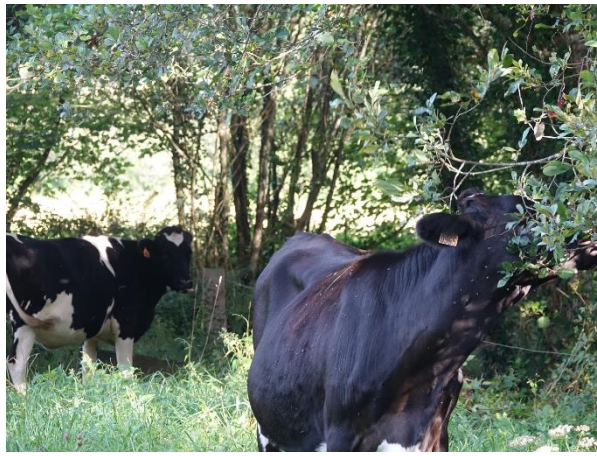
Common reed (*Phragmites australis):*
Characteristic of wet grasslands
High productivity: up to 15-20 tDM/ha (versus 2-4DMT/ha on wet grasslands).
Highly attractive to livestock.
High **Crude Proteins Value (CPV): 120-140 g/kgDM** in August (*SourceN Project)*

+ Azolla *sp.*, Lemna *sp.*

Moors and « abandoned » meadows:
Various plant communities, typically found in Brittany.
Average productivity: 2-3 tDM/ha (versus 4-5tDM/ha on typical grasslands)
Average **CPV: 80-120 g/kgDM**

+ trees, « bocage »



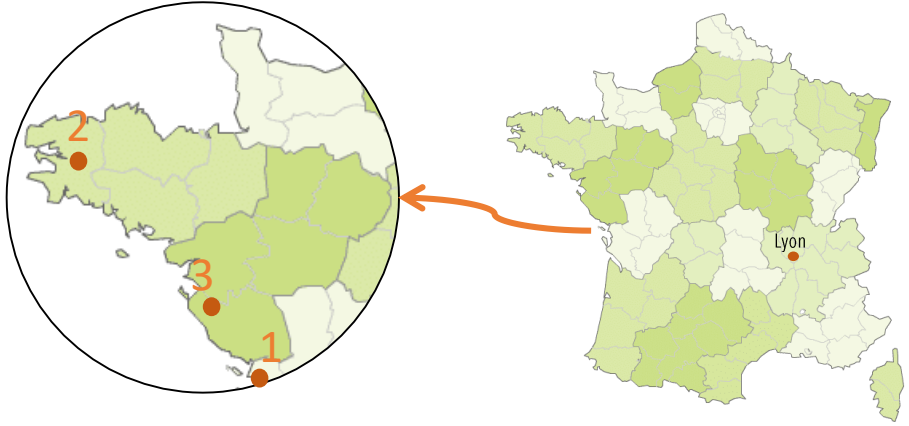



Problematic:

What motivates farmers to use these resources and for what results?
How can the use of atypical resources contribute to the agro-ecological performances of cattle farms?

2) Material and method

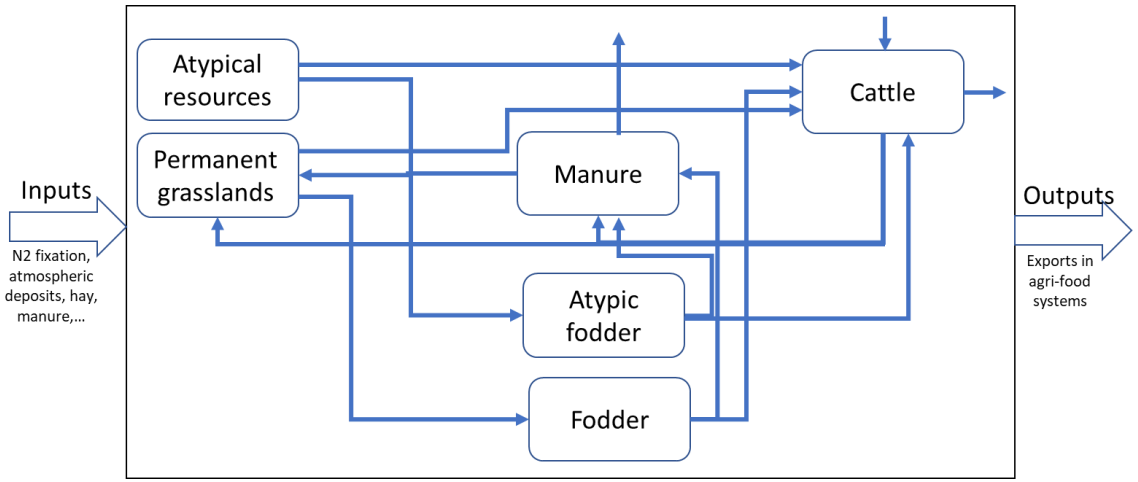
4 farms in the French Grand Ouest region. ***Innovative farms***
Not representative of the farms in this region



« Participative » surveys (Perrin et al. 2020) to:

1) Understand the global strategy of farmers and their motivations to use atypical resources.

2) Analyse of the nitrogen metabolism of farms, to analyse the role of the atypical resources in the agroecological performances of the systems, using Ecological Network Analysis (**ENA**) (Stark et al., 2018)



Conceptual model of agrosystems using atypical resources

2) Material and method

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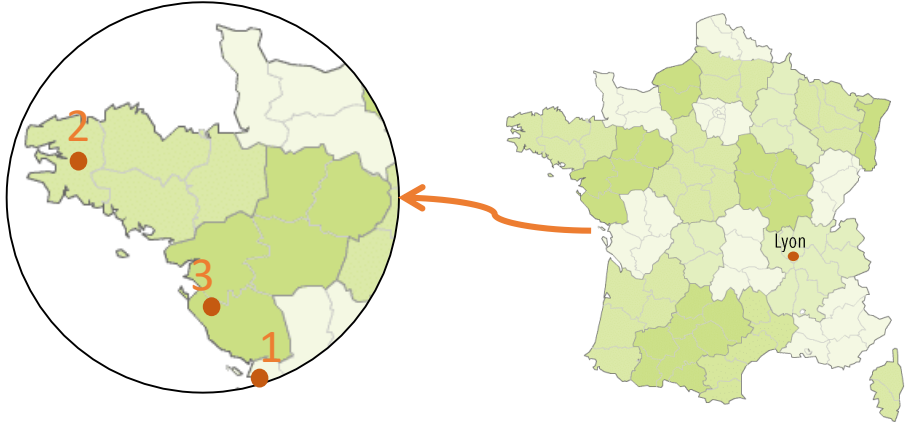
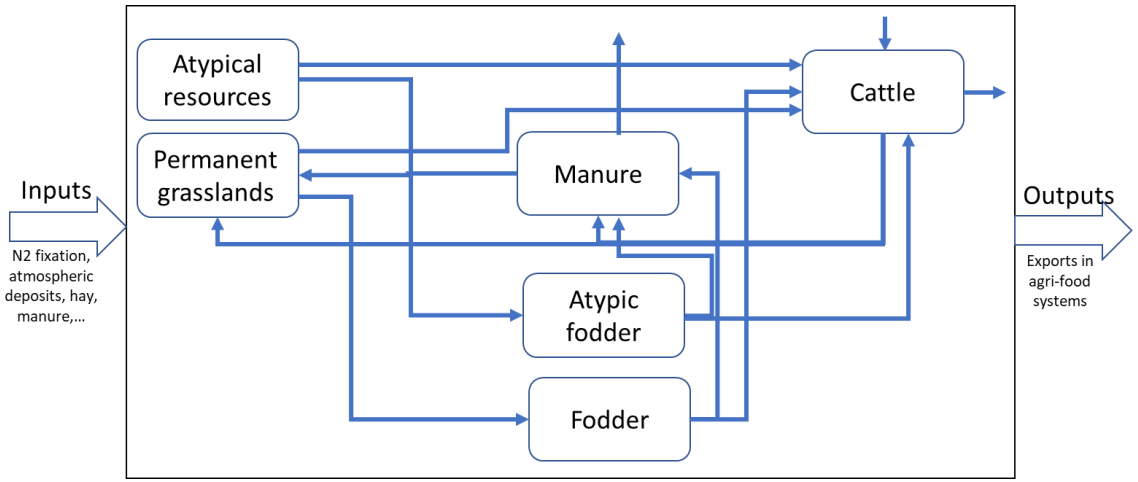


Self-sufficiency= $\frac{\sum \text{renewable input flows}}{\sum \text{input flows}}$

Atypical Resource = feed $\frac{\sum \text{flows from atypical resources to cattle}}{\sum \text{flows to cattle}}$

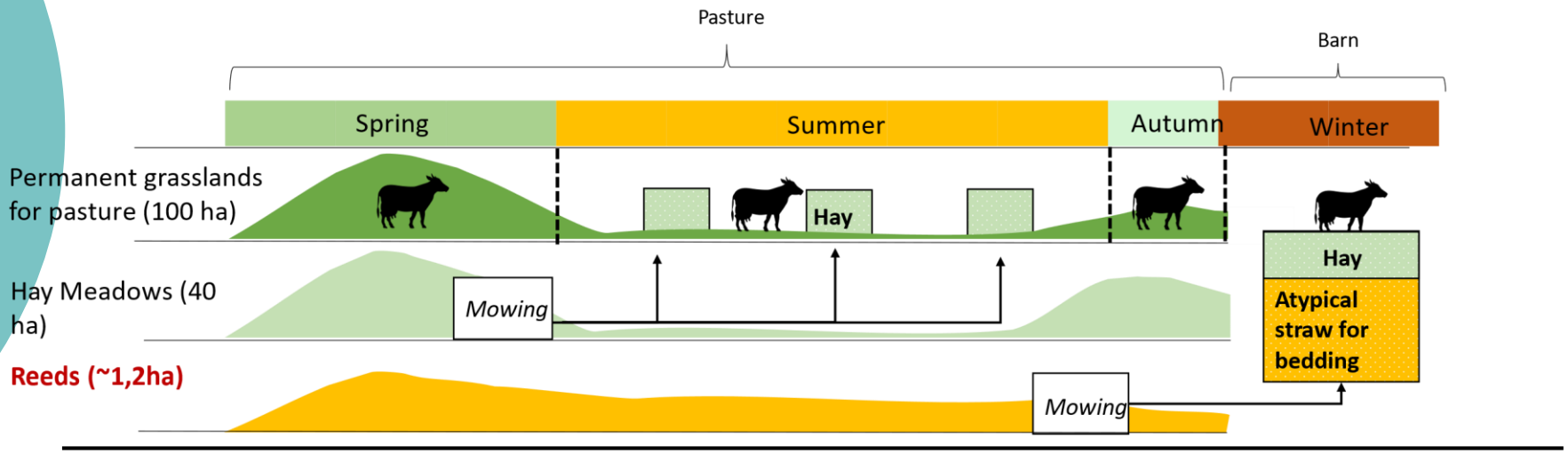
Atypical Resource = Integration $\frac{\sum \text{flows from atypical resources}}{\text{Total intern flows}}$



Conceptual model of agrosystems using atypical resources

3) Results:

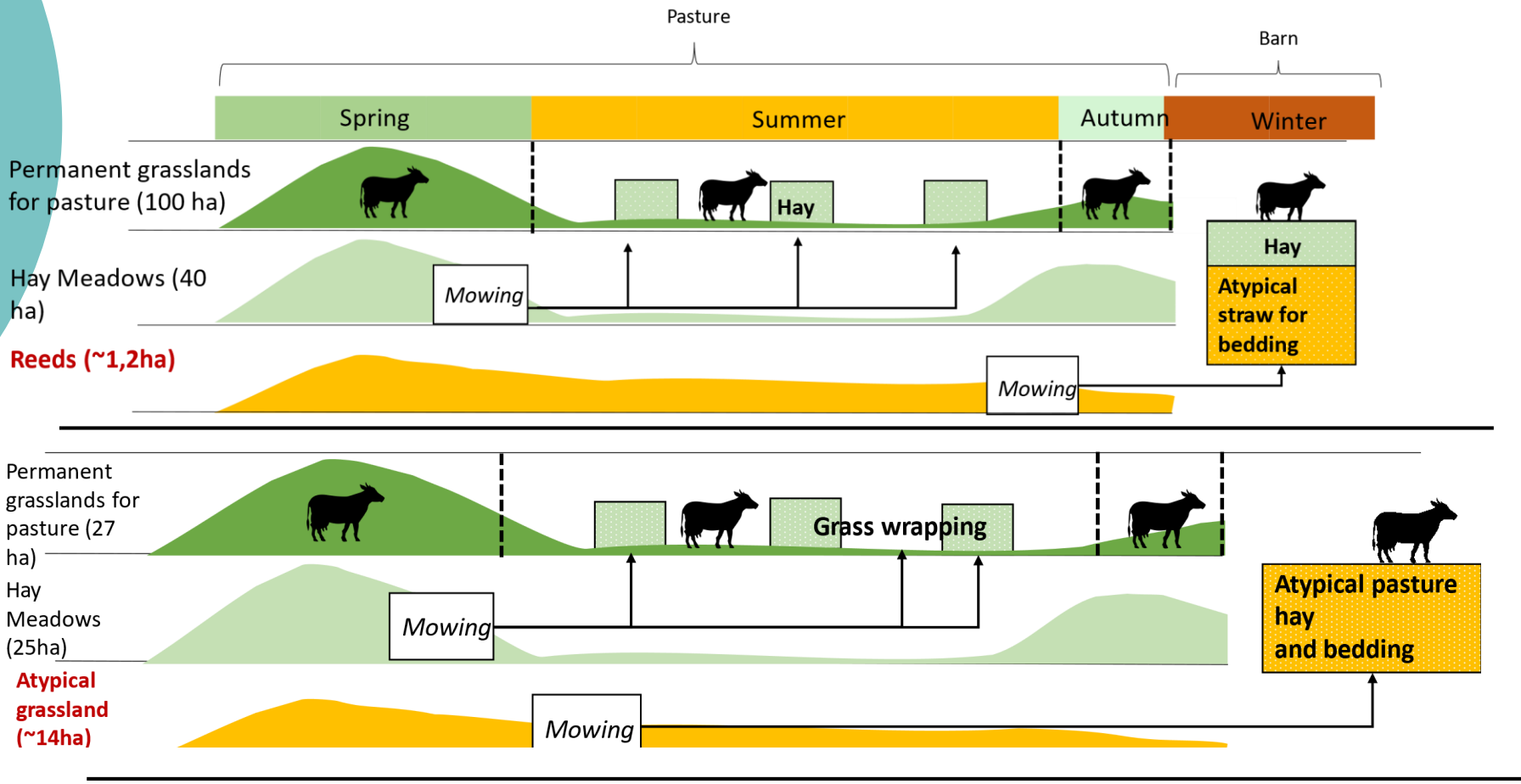
Farm 1: Atlantic wetlands, suckling production



3) Results:

Farm 1: Atlantic wetlands, suckling production

Farm 2: Brittanic « bocage », dairy production

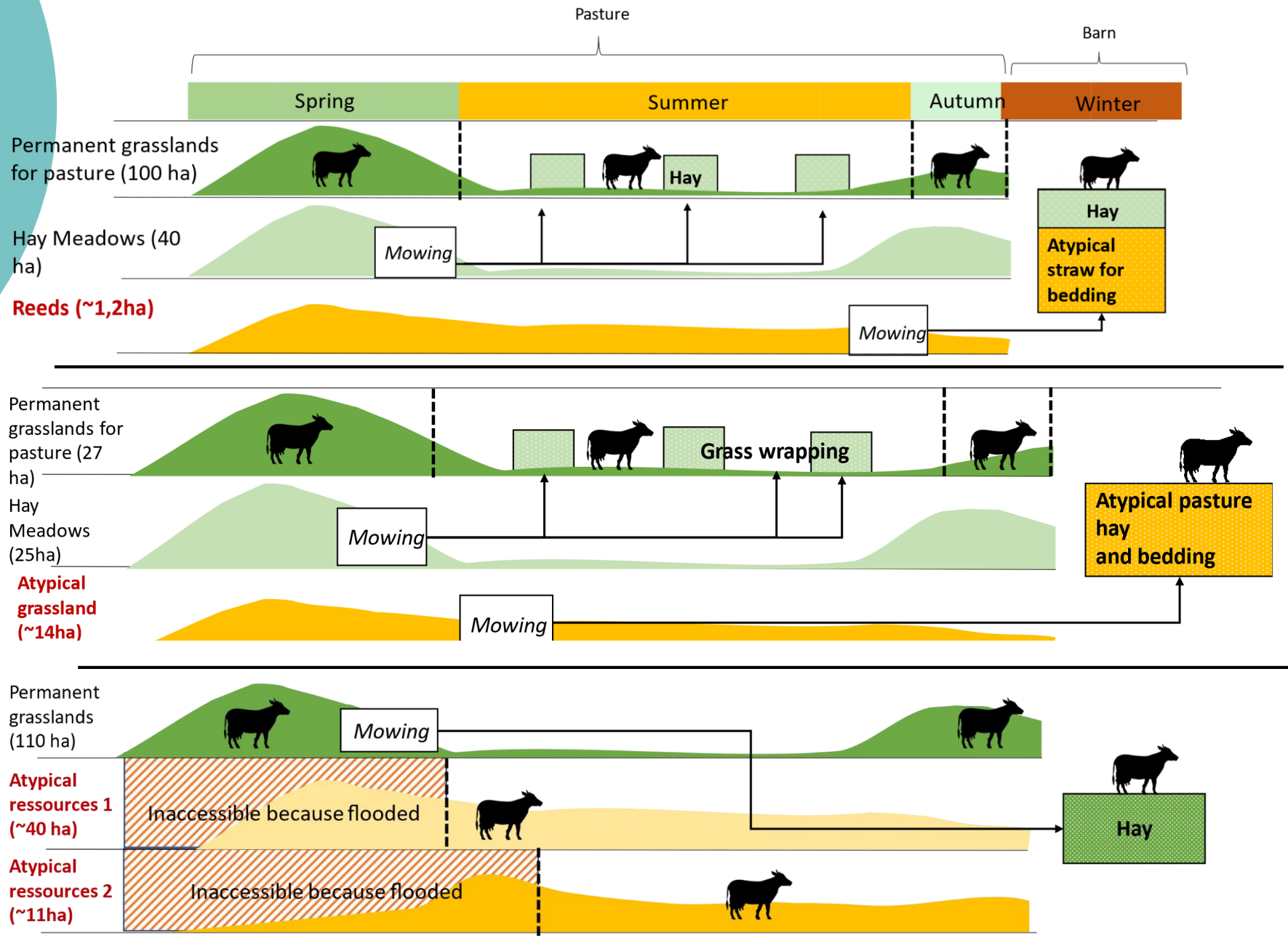


3) Results:

Farm 1: Atlantic wetlands, suckling production

Farm 2: Brittanic « bocage », dairy production

Farm 3: Atlantic wetlands, suckling production



→ 2 strategies identified

The management of atypical resources can help preserve biodiversity

Critical biodiversity issues on the farms:

Objectives in terms of waders biodiversity on Farm 1 and 3:

Vanellus vanellus - Near Threatened worldwide (IUCN)
Target-species on Farm 1

Limosa limosa - Near Threatened worldwide (IUCN)
38 breeding pairs on Farm 3

Objectives for plant biodiversity and « bocage » preservation on Farm 2:

« Meadows with Juncus acutiflorus » E3.42 (EUNIS, MNHN) - Endangered habitat in Europe (Jannssen et al., 2016)
~ 15 ha on Farm 2

Implementing practices that promote the farm's ecosystems:

No inputs on atypical ressources → No pesticides that could harm the floristic and faunistic biodiversity

Late mowing → Mid-summer mowing, so as not to threaten bird nesting, and enhance vegetative reproduction

Sustainable management → The resources can be used every 2 or 3 years, to allow them to grow back and to preserve them for the future

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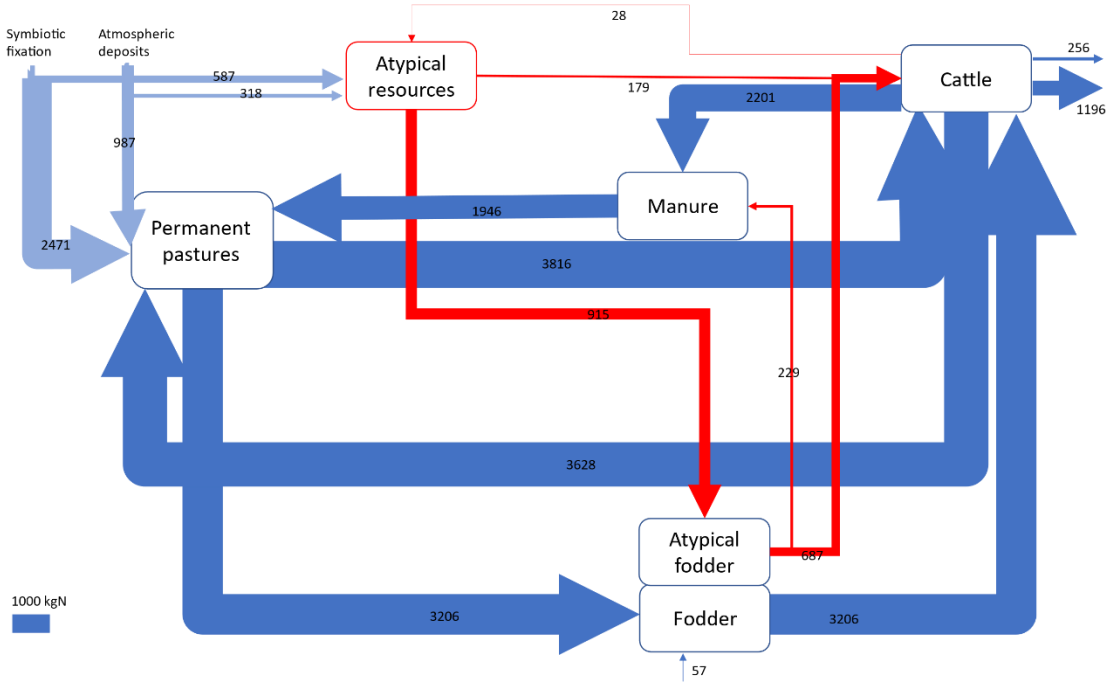
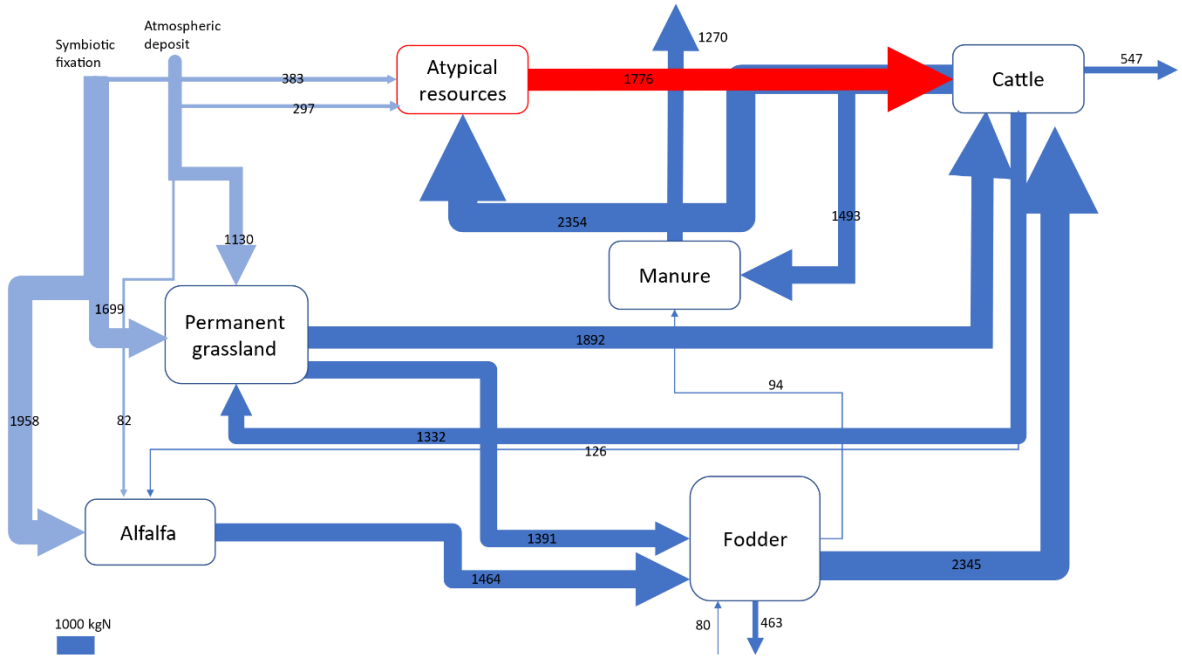
Atypical resources can contribute to the autonomy of systems



Farm 2. Dairy farm with meadows



Farm 3. Suckling farm on wetland

	Self-sufficiency (*including renewable inputs*)	Atypical resources feed	Atypical resources integration
Farm 1	90%	0%	2%
Farm 2	99%	12%	5%
Farm 3	99%	29%	12%

=> Very self-sufficient systems (*mainly based on renewable flows*)

=> Various level of integration of atypical ressources

Conclusion

- Atypical resources are an opportunity for more sustainability in livestock farms, in order to mitigate climate change.
- Self-sufficient systems, and therefore economical = **substitution of parts of the inputs by Natural Capital**
- A way to overcome the challenges of preserving biodiversity

Atypical resources are an opportunity to preserve ecosystems on farms while supporting livestock systems

Thank you for your attention !